

BIOTECH BITS

January 5, 2007

*Compiled by the Montana Agricultural Business Association Biotechnology Committee
Chairman, Mike King*

It is not the strongest of the species that survives, nor the most intelligent, but the one most responsive to change."

**--Charles Darwin,
English naturalist**

Report: Biotech crop plantings reach record worldwide

The International Service for the Acquisition of Agri-Biotech Applications reported a 13% increase in global biotech crop plantings last year from 2005, a record. Most of the 10.3 million farmers involved were subsistence farmers. Argentina, Brazil and the U.S. were the top three countries growing biotech crops, mostly soy. Fort Worth Star-Telegram (Texas)/Associated Press

Global Impact of Biotech Crops: Socio-Economic and Environmental Effects in the First Ten Years of Commercial Use

Graham Brookes and Peter Barfoot, PG Economics Ltd., Dorchester, UK

Genetically modified (GM) crops have now been grown commercially on a substantial scale for ten years. This paper assesses the impact this technology is having on global agriculture from both economic and environmental perspectives. It examines specific global economic impacts on farm income and environmental impacts of the technology with respect to pesticide usage and greenhouse gas emissions for each of the countries where GM crops have been grown since 1996. **The analysis shows that there have been substantial net economic benefits at the farm level amounting to \$5 billion in 2005 and \$27 billion for the ten year period. The technology has reduced pesticide spraying by 224 million kg (equivalent to about 40% of the annual volume of pesticide active ingredient applied to arable crops in the European Union) and as a result, decreased the environmental impact associated with pesticide use by more than 15%. GM technology has also significantly reduced the release of greenhouse!**

e gas emissions from agriculture, which, in 2005, was equivalent to removing 4 million cars from the roads.

Super nutritious wheat touted. Scientists have identified a gene that can significantly increase the protein, iron and zinc content of wheat kernels used in bread and pasta. They say more than 36 million Americans don't get enough zinc, and more than 15 million are short on iron. It's just the latest example of biotech "nutraceuticals," or nutritionally enhanced basic grains. **Doane's Agricultural Report 12/1/06.**

Botanists find gene marker for wheat rust resistance

Australian scientists say they found a DNA marker for the two genes, Lr34 and Yr18, which provide wheat plants with protection against two major diseases, leaf rust and stripe rust.

They say breeders will be able to conduct simple DNA tests to find the marker and breed more rust-resistant wheat varieties. United Press International (12/6)

SemBioSys Signs Contract Manufacturing Agreement for Plant-Produced Insulin with Cangene

SemBioSys Genetics Inc. announced the completion of a Technology Transfer and Manufacturing Agreement with Cangene Corporation, a biopharmaceutical company and contract manufacturing organization, for the processing and purification of SemBioSys' plant-produced insulin.

Full Article: <http://plantpharma.org/ials/index.php?id=438>

SemBioSys Announces Successful Outcome of Personal Care Product Appeal Proceedings at the European Patent Office

SemBioSys Genetics Inc. (TSX:SBS), a biotechnology company developing a broad pipeline of protein-based pharmaceuticals and non-pharmaceutical products today announced that it has received notification that the Appeal Board of the European Patent Office (EPO) has fully revoked European Patent EP 0 680 750 B1 in the name of Yves Rocher relating to the use of oilbodies in the manufacture of cosmetics. SemBioSys' DermaSphere(R) Oleosome Technology is protected by U.S. Patent 6,146,645 and related patents, as well as European Patent Application 98922563.6.

"We believe this favourable decision confirms and clarifies our dominant intellectual property position related to the DermaSphere(R) Oleosome Technology. We place a great deal of importance on properly protecting our novel oilbody-oleosin technology and this is reflected by the comprehensive patent portfolio we have been able to establish," said Andrew Baum, President and CEO of SemBioSys Genetics Inc.

The DermaSphere(R) Oleosome Technology was developed by SemBioSys Genetics Inc. and is based on a natural oil-in-water emulsion derived from plant oilseeds. The emulsion is comprised of naturally occurring oil droplets called oleosomes, in which the oil is surrounded by a shell of phospholipids and unique proteins called oleosin. The oleosome core provides emolliency, occlusivity and anti-oxidant effects, and the outer shell provides emulsifying properties. An oleosome emulsion can be used as the entire non-active portion of the oil phase of a typical cosmetic formulation. With this technology, cosmetic formulations can be prepared under "cold process" conditions, enabling significant savings in time, energy and inventory management. These unique attributes of the DermaSphere(R) oleosomes allow the technology to be used in a wide range of applications including moisturizing creams, sunscreens, ointments, lotions, eye-care products as well as many others.

About SemBioSys Genetics Inc.: (www.sembiosys.com) Calgary, Alberta-based SemBioSys Genetics Inc. is a biotechnology company focused on the development, commercialization and production

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of biopharmaceuticals and non-pharmaceutical products based on its plant genetic engineering skills and proprietary oilbody-oleosin technology platform – the Stratosome(TM) Biologics System. Its two lead pharmaceutical product candidates are insulin and a developmental cardiovascular drug called Apo AI. It also has a series of non-pharmaceutical products addressing animal and aquaculture health, nutritional oils and human topical markets. SemBioSys currently has funded partnership agreements with Martek Biosciences Corporation, Lonza Inc. and Arcadia Biosciences, Inc. [Believe that SemBioSys is using safflower to produce these pharmaceuticals. Safflower does very well in parts of Montana, note added by Mike King]

Study: Gene behind allergic response to peanuts found

Researchers have discovered a gene in peanuts that could lead to the creation of an allergen-free biotech peanut. The scientists said in a study the Ara h 3-im gene contains lower allergenic properties than sister proteins, possibly opening a way to produce a hypoallergenic peanut and offering hope to the millions of people vulnerable to the food allergy. FoodNavigator (11/29)

Peanut council approves developing biotech versions

The American Peanut Council gave its approval for developing biotech peanuts intended to be easier to grow, more nutritious and less likely to trigger allergic reactions. The peanut industry has been cautious about accepting biotech versions, but the council urged scientists to go ahead with the work, with "due diligence." The New York Times/Associated Press (free registration) (12/26)

"A significant redirection in their thinking"

December 30, 2006

A leading industry group has given scientists the go-ahead to build genetically engineered peanuts that could be safer, more nutritious and easier to grow than their conventional version.

The work could lead to peanuts that yield more oil for biofuel production, need less rainfall and grow more efficiently, with built-in herbicide and pest resistance — traits that have already been engineered into major crops such as cotton, corn, soybeans and canola.

For consumers, the work could lead to peanuts with enhanced flavor, more vitamins and nutrients, and possibly even nuts that are less likely to trigger allergic reactions, a life-threatening problem for a small percentage of the population and a major food industry concern.

A few researchers have been genetically modifying peanuts for at least a decade, but their discoveries have had little impact because the industry, fearing a consumer backlash, was reluctant to support the work. However, with the two leading peanut-producing countries, China and India, working aggressively on transgenic peanuts, the American Peanut Council and its research arm, the Peanut Foundation, this month approved a major policy change. The council represents all segments of the industry — growers, shellers, exporters and manufacturers. The foundation urged scientists to move ahead with "due diligence" on genetically engineered peanuts. The work is expected to cost about \$9.5 million and will require university, government and industry support.

"It's a significant redirection in their thinking," said Peggy Ozias-Akins, a University of Georgia horticulture professor who has been working with genetically modified peanuts since the late 1990s. Because peanuts are considered a minor crop, their genetics still have not been

studied as extensively as major crops such as soybeans, Ozias-Akins said.

The U.S. peanut acreage dropped from nearly 1.7 million acres in 2005 to 1.2 million this year, while the acreage for two crops that benefit from genetic modification, cotton and soybeans, increased. While experts say peanut acreage may drop again next year, scientists believe genetically modified peanuts could help reverse the trend.

A group of 14 university, U.S. Agriculture Department and food industry scientists, including Ozias-Akins, prepared a report on biotech peanuts and presented it recently to the Peanut Foundation. The scientists concluded the technology could reduce growing costs, improve nutrition and overall quality for consumers and have the potential to reduce the allergy threat in peanuts.

A small amount of genetically modified sweet corn, squash and about half of Hawaii's papayas are the only U.S. crops currently grown for human consumption, said Gregory Jaffe, biotechnology director for the Center for Science in the Public Interest, a consumer advocacy group.

"Overall, our view is that genetic engineering is a technique that can be used to overcome grower problems, or to enhance consumer value in products," he said. "We support that as long as those products have been determined safe for human consumption."

By Elliott Minor, Associated Press

U.K. clears BASF to grow biotech potatoes

The British government today was expected to clear **BASF** of Germany for permission to grow biotech crops in the country. The agreement provides for two trials by BASF to produce biotech potatoes beginning next year on two plots of land in central England. Reuters (12/1)

Biotech group says BASF potato could boost starch industry


The European Association for BioIndustries, countering opposition by environmentalists, said the **BASF** biotech potato could help boost the continent's potato starch industry. FoodNavigator (12/5)

Simplot under 10 years away from first biotech potato

J.R. Simplot Co. believes it could be just five years away from producing the first flavor-enhanced biotech food, an Idaho potato that also reduces acrylamide risks. Biologists are basing their work on two of the potato's 50,000 genes to increase healthy starch by 7% and create a stronger flavor. USA TODAY/Associated Press (1/8)

New yeast strains reduce carcinogen in wine, bread

First Venture Technologies announced it has developed six new strains of biotech yeast that can reduce levels of the carcinogen ethyl carbamate in red wine by up to 89% and up to 54% in bread. FoodNavigator (12/4)



Colorado bullish on cellulosic ethanol

By Gargi Chakrabarty, Rocky Mountain News
December 26, 2006

The U.S. could turn off the foreign oil spigots by making fuel out of cornstalks, stover, switch grass, straw or virtually any biomass. Forget drilling thousands of oil and gas wells. Companies instead could gather the nation's abundant forest and agricultural wastes, process those to extract sugar and ferment the sugar to produce fuel. It's called cellulosic ethanol, and some say it is the environmentally friendly way to feed the country's energy needs. The biggest hurdle is that it's substantially more expensive to make than traditional oil or even ethanol from corn. Yuma County plans to have the state's, and possibly the nation's, first cellulosic ethanol plant. A Fort Lupton company is considering building a \$50 million plant. Construction would begin by 2010, and the plant would pump out fuel the following year.

Ethanol Push Could Lift Prices For U.K. Wheat BY LISA KALLAL

LONDON -- Prices for U.K. wheat are likely to rise, and exports shrink, as the government pushes to have more of it converted into ethanol. The number of wheat-ethanol projects announced for sites around the U.K., together with plans for an existing artificial-sweetener factory to switch to wheat from corn, add up to about 3.4 million metric tons a year of additional demand for the crop, the country's biggest grain by production. In the process, U.K. wheat prices could increase to parity with the price of imported wheat, industry experts say.

A giant corn plastics plant has been announced for Clinton, IA by Metabolix Inc. The new facility will produce 110 million pounds of its corn-based, biodegradable plastic annually. It will be the first time Natural Plastic has been produced outside of a laboratory and mark the beginning of another fast-growing new market for corn.

Doane's Agricultural Report. December 22, 2006

Scientists create BSE-resistant cattle

Japanese and U.S. scientists used gene-targeting to remove the prion protein gene linked to bovine spongiform encephalopathy and its human form, Creutzfeldt-Jakob disease. They hope BSE-resistant cattle can be used to provide dairy and other products free of the disease and as models for the study of prion disease processes. The Sydney Morning Herald/Reuters
(1/2)

Cauliflower gene could make other crops more nutritious

U.S. scientists say a cauliflower gene might be used to boost levels of beta-carotene in other food crops. The gene, isolated by researchers at Cornell University, promotes high beta-carotene accumulation in various plant tissues that normally do not have carotenoids.
FoodNavigator

South African researchers develop biotech wine grapes

South Africa's Institute for Wine Biotechnology is developing wine grapes that could be grown without the need for sprays to fight fungal infection. The goal is to make wine "more environmentally friendly" and allow farmers to use less chemicals, one researcher said. Star Tribune (Minneapolis-St. Paul)/Associated Press (free registration) (12/12)

Only those who dare to fail greatly can ever achieve greatly."

--Robert F. Kennedy,
former U.S. attorney general and politician

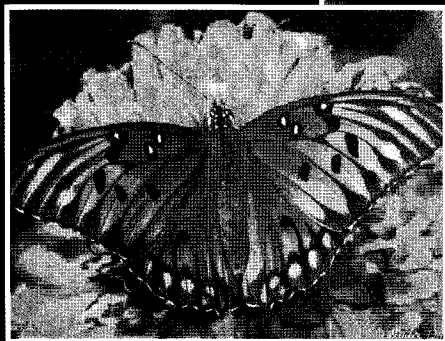
All that is necessary for evil to succeed is that good men do nothing."

--Edmund Burke,
British politician, writer

Agricultural Biotechnology

New advances in an ancient tradition
offer promise for the

future



An ancient tradition

The dawn of civilization arrived more than 10,000 years ago, built on what historians call the Agricultural Revolution. It was when our ancestors learned to plant crops and domesticate animals they could grow enough food to live in one place and develop cities, economies, governments, and all the other elements of civilization. In fact, the development of civilization runs parallel with the history of agriculture. Along with developing better ways of tilling the soil, sowing seeds, and harvesting crops, for thousands of years farmers have been altering the genetic make-up of their crops. Modern agricultural biotechnology continues this ancient farming tradition of continually improving crops. In short, agricultural biotechnology has been like a benevolent spirit bringing us new and better crops, foods, fabrics, preserving our soils and waters from ruination, and helping to save millions from starvation.

10,000 years of farming progress

Almost all crops species we grow today differ from the wild species from which they were bred. Due to the continual refinement of plant genetics and agricultural techniques, modern farming as we know it today – and most of the foods on our tables and the fibers that go into our textiles – would be nearly unrecognizable to the men and women of 10,000 years ago. In the beginning, plant breeding was a matter of trial-and-error, but that all changed in the 1880s, when the science of genetics was born, and with it agricultural biotechnology. It then became possible to select specific desired characteristics in plants. Some famous names were part of this revolution. **Gregor Mendel**, the father of genetics, was a plant breeder. And as we consider the advances contributed by horticulturist **Luther Burbank** and agricultural researcher **George Washington Carver**, it's clear that agricultural biotechnology has made significant improvements benefiting society.

The promise of agricultural biotechnology

In a world faced with mounting challenges, agricultural biotechnology offers solutions to a wide array of problems – so much so that it might be said that Ag biotech is the wave of the future that will enable society to flourish. Agricultural biotechnology has and will continue to provide innovative solutions that attack hunger, provide needed nutrition and medicines, improve the environment, enhance the economy, save the family farm and improve the health of individuals and society. In short, agricultural biotechnology is an outstanding example of science in service to humankind and nature.

Addressing legitimate concerns

As with any new technology, there are legitimate concerns about the safety of agricultural biotechnology, particularly the safety of genetically modified (GM) crops. It is essential that the foods we eat are not just nutritious and tasty, but safe and healthy as well.

Fact:

The United States, Canada, Brazil, Argentina, Australia, China, South Africa and other countries have been producing genetically modified crops for years. More than 100 GM products have been specifically approved for production or consumption in about a dozen countries or economic blocs worldwide.

Agricultural biotechnology offers breakthrough environmental benefits:

- Increased crop yields
- Reduced use of herbicides and insecticides, yielding safer food and a safer environment
- Greater crop resistance to diseases
- Improved weed control
- Enables small farmers to be economically viable
- Reduced run-off of agricultural soils bearing pesticides into surface waters



People have been consuming foods with some GM ingredients and other products for many years without ill effects. A great deal of research has gone into the study of GM crops and foods. *This research, and our collective experience, has demonstrated the safety of the technology and its products, at both the points of production and consumption.*

Unfortunately, the producers of agricultural biotechnology have not always effectively communicated their findings or allayed legitimate concerns, mistakenly believing that the benefits of their science would be self-evident.

Given the communication vacuum a lot of misunderstandings, urban legends and deliberate untruths have been circulated about crops and foods with GM ingredients. Some of this misinformation is politically motivated and orchestrated by special-interest groups. Interestingly, some of the governments that have been most strident in their opposition to American-produced GM crops and foods are starting to change their position on the subject. This is less an indication that they have suddenly found that foods with GM ingredients are safe, as much as they are catching up with the technology and now want to compete with American products.

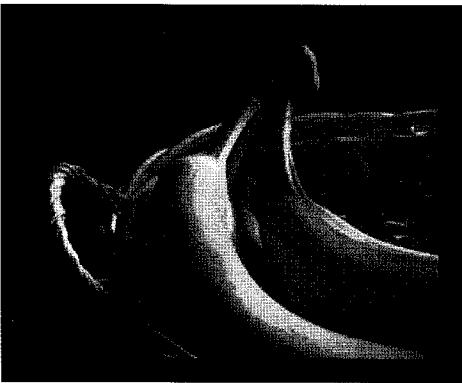
A better environment

It is ironic that environmental groups – such as the Northern Plains Resources Council (NPRC), Greenpeace and others – oppose agricultural biotechnology since many GM crops can and do conserve soil and water, require a lower amount of pesticides, and produce significantly greater yields from the same cultivated acreage.

Misleading criticism of foods with GM ingredients can have grave consequences. For example, who can justify condemning tens of thousands to hunger and starvation, which happened in Zimbabwe, because governments and special interest groups spread disinformation on crops and foods that millions eat safely in our country everyday? Many common foods and fibers – cereals, oils, cotton, confections, ice cream, honey and nutritional supplements – that millions have been eating and using happily and safely for years contain genetically modified ingredients. Instead of treating agricultural biotechnology as a benevolent innovation that can save us from a variety of environmental and social calamities, some argue that it represents a threat to civilization. Strange? History shows that beneficial new technologies, such as pasteurization, are often greeted with skepticism.

By 2025:

- Global population will increase from 5.8 billion today to 8.5 billion people, with the greatest increases taking place in developing countries
- Prime agricultural land will remain the same or decrease
- Worldwide life expectancy will increase from today's average of 68 years to 73 years
- The food gap – the difference between food production and food demand – will more than double to 228 million tons by 2025
- Agricultural biotechnology can minimize these problems



Changing attitudes and market acceptance

Perhaps the most persuasive argument that opponents of GM crops, such as GM wheat, have been able to muster is that legal restrictions in many countries make growing and exporting of those crops a risky business. The global hysteria that these groups have whipped up over GM crops and foods have created a self-fulfilling prophecy. However, attitudes are changing in Europe, Asia and elsewhere around the globe. China and India have embraced the technology and between the two of them, make up one-third of the world's population. On-going education, more enlightened regulatory environments, and effective trade promotion is helping to dismantle some of the trade barriers against agricultural biotechnology and is creating new market acceptance.

The spirit of biotechnology: Hope for a better future

History tells us that agricultural biotechnology has been with us for thousands of years. Just as agriculture formed the basis for civilization, modern agricultural biotechnology can be the basis of a better future for all humankind. But we must be vigilant. History also tells us that there is always resistance to new ideas. In centuries past, ignorant people burned so-called "witches" at the stake. While we have progressed beyond that dark time, today we need to recognize that agricultural biotechnology is a benevolent force that must not be burned at the stake of misinformation like the "witches" of old.

Our future and the quality of life may depend on it.



The spirit of agricultural biotechnology: hope for a better future

- Enhances the economy
- Improves the health of people and society
- Improves the environment
- Is safe and proven

For more information on the benefits of agricultural biotechnology,
see the following web sites:

www.agbioforum.org

www.whybiotech.com

www.isb.vt.edu

www.colostate.edu/programs/lifesciences/TransgenicCrops

www.isaaa.org/kc

www.fao.org/biotech/forum.asp